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**Question Paper Code : 57264**

**B.E. /B. Tech. DEGREE EXAMINATION, MAY/JUNE 2016**

**First Semester**

**Civil Engineering**

**CY 6151 – ENGINEERING CHEMISTRY – I**

**(Common to all branches except Marine Engineering)**

**(Regulation 2013)**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A (10 × 2 = 20 Marks)**

1. Differentiate between thermoplastics and thermosetting polymers.
2. Define degree of polymerization.
3. Write down the criteria of spontaneity.
4. What is Gibbs free energy ?
5. What is fluorescence ?
6. State Beer-Lambert law.
7. Define degree of freedom.
8. What are the basic differences between brass and bronze ?
9. What are nano rods ?
10. List out any four applications of nano materials.

**PART - B (5 × 16 = 80 Marks)**

11. (a) (i) Write the preparation and properties of (8)

- Nylon 6,6
- Epoxy resins

(ii) Distinguish between addition and condensation polymerization (8)

**OR**

(b) (i) Discuss the mechanism of addition polymerization. (8)

(ii) Explain the number average and weight average molecular weight. (8)

12. (a) (i) Prove the Maxwell relation (8)

$$\left(\frac{\partial V}{\partial T}\right)_P = -\left(\frac{\partial S}{\partial P}\right)_T$$

(ii) Derive Gibbs Helmholtz equation (8)

**OR**

(b) (i) Derive an expression for entropy change of an ideal gas at constant temperature (8)

(ii) Derive Clausius-Clapeyron equation. (8)

13. (a) (i) Explain the Einstein-Stark law of photochemical equivalence. (8)

(ii) Draw the block diagram of IR spectrometer and explain the function of various components. (8)

**OR**

(b) (i) Explain the term photosensitization and quantum yield. (8)

(ii) Explain in detail, vibrational and rotational transition. (8)

14. (a) (i) Draw the phase diagram for lead-silver system and explain the salient features. (8)
- (ii) Explain the function and effects of alloying elements. (8)

**OR**

- (b) (i) Write a note on heat treatment of steel. (8)
- (ii) Draw and explain the labelled phase diagram of water system. (8)

15. (a) (i) Explain how nano materials are synthesized by laser ablation method and thermolysis. (8)
- (ii) What is chemical vapour deposition ? Explain thermal CVD and photo laser CVD . (8)

**OR**

- (b) (i) Write short notes on : (8)
- Nano clusters
  - Nano wires
- (ii) Briefly explain any four important properties of nano materials. (8)